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**UTILITY PATENT APPLICATION TRANSMITTAL
(Small Entity)***(Only for new nonprovisional applications under 37 CFR 1.53(b))*Docket No.
602927.090085Total Pages in this Submission
34**TO THE ASSISTANT COMMISSIONER FOR PATENTS****Box Patent Application
Washington, D.C. 20231**

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

AUTOMATIC PRESSURE RELEASE TOOTHBRUSH

and invented by:

Ingram S. Chodorow and Zubair Mirza

If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Which is a:

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☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Enclosed are:

Application Elements

1. ☐ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 16 pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☒ Cross References to Related Applications *(if applicable)*
 - c. ☐ Statement Regarding Federally-sponsored Research/Development *(if applicable)*
 - d. ☐ Reference to Microfiche Appendix *(if applicable)*
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings *(if drawings filed)*
 - h. ☒ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☒ Abstract of the Disclosure

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34

Application Elements (Continued)

3. ☒ Drawing(s) (when necessary as prescribed by 35 USC 113)
- a. ☐ Formal b. ☒ Informal Number of Sheets 10
4. ☒ Oath or Declaration
- a. ☒ Newly executed (original or copy) ☐ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional application only)
- c. ☒ With Power of Attorney ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference (usable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Computer Program in Microfiche
7. ☐ Genetic Sequence Submission (if applicable, all must be included)
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☒ Assignment Papers (cover sheet & documents)
9. ☐ 37 CFR 3.73(b) Statement (when there is an assignee)
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☒ Certificate of Mailing
- ☐ First Class ☒ Express Mail (Specify Label No.): EK052282412US

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Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)

16. ☒ Small Entity Statement(s) - Specify Number of Statements Submitted: 1

17. ☐ Additional Enclosures (please identify below):

10 sheets of drawings - Figs. 1-12

Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	30	- 20 =	10	x \$9.00	\$90.00
Indep. Claims	7	- 3 =	4	x \$39.00	\$156.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$345.00
OTHER FEE (specify purpose)					\$0.00
TOTAL FILING FEE					\$591.00


- ☐ A check in the amount of _____ to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. 50-1145 as described below. A duplicate copy of this sheet is enclosed.
- ☒ Charge the amount of \$591.00 as filing fee.
 - ☒ Credit any overpayment.
 - ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
 - ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Dated:

5-31-00


Signature

cc:

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)			Docket No 602927.090085	
Applicant(s): Ingram S. Chodorow and Zubair Mirza				
Serial No. to be assigned	Filing Date May 31, 2000	Examiner unknown	Group Art Unit unknown	
Invention: AUTOMATIC PRESSURE RELEASE TOOTHBRUSH				
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>I hereby certify that this <u>New Utility Patent Application</u></p> <p style="text-align: right; font-size: small;"><i>(Identify type of correspondence)</i></p> <p>is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: The Assistant Commissioner for Patents, Washington, D.C. 20231 on</p> <p style="text-align: center;"><u>May 31, 2000</u></p> <p style="text-align: center; font-size: small;"><i>(Date)</i></p> </div> <div style="width: 50%; text-align: center;"> <p><u>DAVID DAINOW</u></p> <p style="font-size: small;"><i>(Typed or Printed Name of Person Mailing Correspondence)</i></p> <p><u></u></p> <p style="font-size: small;"><i>(Signature of Person Mailing Correspondence)</i></p> <p><u>EK052282412US</u></p> <p style="font-size: small;"><i>("Express Mail" Mailing Label Number)</i></p> </div> </div>				
<p>Note: Each paper must have its own certificate of mailing.</p>				

Serial or Patent No.: 60/154,418 OPGS File No. P/3483-3 (602927.090085)
Filing or Issue Date: September 17, 1999
Applicant or Patentee: Ingram S. Chodorow and Zubair Mirza
For: AUTOMATIC PRESSURE RELEASE TOOTHBRUSH

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
37 CFR 1.9(f) and 1.27(c) - SMALL BUSINESS CONCERN

I hereby declare that with regard to the small business concern identified below I am
☐ the owner of the small business concern
☒ an official of the small business concern empowered to act on behalf of same
NAME OF CONCERN: Placental, Inc.
ADDRESS OF CONCERN: P.O. Box 675167, 14478 Altamar Court, Rancho Santa Fe, CA 92067

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 37 CFR 1.21.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under 35 USC §41(a) and (b) in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns the affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention entitled
AUTOMATIC PRESSURE RELEASE TOOTHBRUSH by inventor(s)
Ingram S. Chodorow and Zubair Mirza described in
☐ U.S. Patent Application filed herewith
☒ U.S. Patent Application Serial No. 60/154,418 filed 9/17/99
☐ U.S. Patent No. _____ issued _____

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having the rights to the invention is listed below* and no rights to the invention are held by any person other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(c) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a non-profit organization under 37 CFR 1.9(e). *NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities 37 CFR 1.27.

NAME: _____
ADDRESS: _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NON-PROFIT ORGANIZATION
NAME: _____
ADDRESS: _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NON-PROFIT ORGANIZATION

I acknowledge the duty to file in this patent application or patent, notification of any change of status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. 37 CFR 1.29(b).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC §1001, and that such willful false statements may jeopardize the validity of the patent application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: INGRAM S. CHODOROW
ADDRESS OF PERSON SIGNING: P.O. Box 675167, 14478 Altamar Court, Rancho Santa Fe, CA 92067

SIGNATURE: Ingram S. Chodorow ✓ DATE: 12-1-99 ✓

NEW PATENT APPLICATION
Attorney Docket No. : 602927.090085

APPLICATION FOR UNITED STATES LETTERS PATENT

TO WHOM IT MAY CONCERN:

Be it known that we, Ingram S. Chodorow , a citizen of the United States residing at 14478 Altamar Court, P.O. Box 675167, Rancho Santa Fe, CA 92067 and Zubair Mirza, a citizen of the United States residing at 570 Fairview Avenue, Wyckoff, New Jersey 07481, have invented new and useful improvements in:

AUTOMATIC PRESSURE RELEASE TOOTHBRUSH

of which the following is the specification.

CROSS REFERENCE TO RELATED

APPLICATION

This application is based on and claims priority of United States Provisional Patent Application No.: 60/154,418 filed September 17, 1999, entitled AUTOMATIC PRESSURE RELEASE TOOTHBRUSH

BACKGROUND

1. Field of the Invention

This invention is in the field of toothbrushes, particularly typical toothbrushes where the user applies oscillating, linear, circular and other motions along with varying amounts of axial pressure of the bristles on the tooth and gum surfaces.

2. Background of the Invention

It is well accepted that regular brushing of the teeth along with flossing, dental examinations, and other appropriate care is essential to maintain healthy teeth and gums or to at least to minimize deterioration. In this regard hundreds of millions of toothbrushes are used regularly throughout the world.

A variety of new toothbrush designs have been periodically introduced into the oral care market with new features that improve performance or ergonomics. Some of the many new designs included different angles of the head and/or the bristles, different tuft designs, varying hardness and stiffness of the bristles, and even wear markers either on the handle or in the bristles to indicate fatigued bristles and to signal the time to replace the toothbrush. Also, in recent years mechanized toothbrushes have been introduced which move bristles in various circular or transverse motion patterns, and also axially at extremely high speeds.

Many of these toothbrushes represented significant advances. However, one particular issue or problem persists and has led to proposed solutions which run the gamut of extremes. This is the issue of how stiff and/or hard the bristles should be to adequately clean the teeth without damaging the enamel surface of the teeth.

About twenty-five years ago hard or stiff bristles were preferred, because soft and medium bristles were considered too weak to achieve adequate cleaning. Makers of brushes with natural bristles proclaimed their products safer and superior to nylon and other plastic bristles. More recently, soft bristles have been generally considered by dentists as the only safe bristles to use to avoid both enamel and gum damage.

The debate remains unresolved as to which of the above toothbrushes is best; however, a vast number of people continue to suffer from worn enamel and/or bleeding or sore gums because of the toothbrushes or brushing techniques they use. Thus, none of these dental developments has adequately solved the above discussed problems of damaged enamel and gums caused by the toothbrushes or brushing techniques.

SUMMARY OF THE INVENTION

The present invention (a) recognizes the failure of the oral care industry to develop a toothbrush with ideal bristles that are best or safest with regard to enamel and/or gum damage, and (b) proposes a totally different approach that solves the problem and is applicable with all or most existing toothbrushes.

The issue the present invention addresses is excessive pressure applied to the teeth and gum surfaces during brushing. All of the attempted solutions with different bristle materials, tuft patterns, varying stiffness and handle ergonomics fail to deal with the fundamental fact that users of toothbrushes apply by their own hands uncountable variations in pressure of the bristles onto their own teeth. Not only does each person exert a different force, each person will vary his or her force depending on the angle of the hand holding the brush as different areas of the mouth are brushed. So, a medium bristle may be applied very hard in some areas, or a hard or medium bristle may be pressed inadequately to properly clean. There is no way to effectively teach people exactly how hard to press the tuft or bristles against the teeth and gums, and

because of varying angles of toothbrushes and arm and finger positioning any attempted pressure level could not be maintained constant anyway.

The new toothbrush invention includes a hinge between the handle and the head with its bristles. When light to moderate pressure is applied it performs like all other toothbrushes. When the pressure of the bristles on the teeth is excessive according to a predetermined safe level of pressure, the hinge automatically releases the head causing it to bend backward, in a direction away from the teeth.

The hinge has a preset pressure threshold. In typical toothbrush use a person holds the handle and through the handle and the head at the end thereof, applies pressure of the bristles onto the teeth. It is basic mechanics that the pressure applied by the bristles is experienced by the head of the toothbrush and by the hinge to which the head is coupled. When this pressure reaches the predetermined unsafe threshold level, the hinge gives way, and in a preferred embodiment snaps to a new position whereby the head is in an awkward and unusable position, and the user is forced to stop brushing and stop applying the excessive pressure. This alteration of the toothbrush structure remains until the user manually corrects it by snapping or otherwise pushing the head back into its original position.

This elegant and simple solution automatically prevents excessive force from being applied to the teeth and gum surfaces, and more importantly, teaches the user what excessive pressure feels like so that an excessive level of force can be avoided and a correct level learned and maintained. The new hinge can take a variety of forms, the preferred one at present being a bi-stable spring having two positions where the spring is integrally molded with the toothbrush handle and head. This hinge is a type of toggle mechanism whereby the head is biased to go to and remain in either a first position (normal position) or in a second position which is intended to be so awkward that it is essentially un-usable. The transition from first to second position occurs when the user presses the bristles too hard against the teeth. This force is transmitted to the head and thence to the hinge which automatically reverses its configuration and drives

the head to said second position. In a variation the hinge would merely release the head from being held in said first position and leave it floppy or loosely attached to the handle. The toothbrush remains essentially unusable until the user manually returns the head back to said first position. This return automatically activates the hinge spring to its first condition wherein it biases the head to stay in said first position until the force on the head again becomes excessive causing the head to snap to said second position.

One preferred embodiment of the hinge uses a rectangular elongated strip of resilient plastic compressed in the longitudinal direction until it bows and functions as a bi-stable spring; another preferred embodiment uses an elongated spoon-like or concave spring of resilient plastic; a third preferred embodiment uses a two-part hinge with a bi-stable biasing spring between these parts.

In all of these configurations the spring will, when excessively stressed, snap to an inverted stressed configuration. Application of such excessive force by the user to the bristles and thence to the toothbrush head will bend the head which is firmly connected to said top end of the hinge that snaps to its second position. Subsequently, the head is either manually forced back to its first, normal position, or it can be designed to return automatically after a predetermined time period.

Preferred embodiments of this invention will be described below with reference to the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a right side elevation view partially in section of a first embodiment of the new invention,

Fig. 2 is a rear elevation view thereof,

Fig. 3 is a front elevation view thereof,

Fig. 4 is a fragmentary sectional view taken along line 3-3 in Fig. 2,

Fig. 4A is a side elevation similar to Fig. 4 but shows the hinge activated and the toothbrush head moved to its second position,

Fig. 5 is a schematic side elevation view similar to Fig. 1 but of a second embodiment,

Fig. 6 is a rear elevation view of Fig 6,

Fig. 7 is a front elevation view of Fig. 6,

Fig. 8 is a fragmentary side view taken along line 9-9 in Fig. 8,

Fig. 9 is a fragmentary front and right side perspective view of the toothbrush of Figs. 6 and 8,

Fig. 10 is a front elevation view of Fig. 10,

Fig. 11 is a cutaway right side elevation view of a fourth embodiment of the new toothbrush with a multiple component hinge,

Fig. 11A is an exploded perspective view of the hinge of Fig. 11,

Fig. 11B is a fragmentary section taken through Fig. 11, and

Fig. 12 is a fragmentary side elevation view of a fifth embodiment showing it in two positions.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The first embodiment 10 of the new toothbrush is seen in Figs. 1-3, 4 and 4a-4i consisting of a handle 11, head 12 with bristles 13 and a hinge 14 connecting the head and handle. Figs. 2-4 show further details of the hinge 14 comprising a central strip 15 having top and bottom ends 15T and 15B respectively and intermediate arch or bow 15C.

Fig. 3 shows the hinge as essentially three parallel strips, namely central spring strip 15 and adjacent outer strips 16. Figs. 4 and 4a show further details of hinge 14 where the arch or bow spring element 15 is connected by its tip part 15T to the head 12 and by its bottom part 15B to the handle 11. This arch has a bowed configuration because it is in axial compression while the adjacent elements 16 are in tension. The bow is a bi-stable spring which attains a first stable condition or position shown in Fig. 4 with the longitudinal axis 12A of the head angled slightly to the left of the

longitudinal axis 11A of the handle, and a second stable condition 18 shown in dotted lines in Fig. 4a with the spring element 15 from the right side position in Fig. 4 to the left side position in dotted lines in Fig. 4A, and with the head inclined to the right. This results from a force applied in the rightward direction to the head as indicated by arrow 19.

Most toothbrushes have the head either coaxial with the handle or angled forward as seen in Figs. 1 and 4; the rearward angle of the head per longitudinal axis 4R in Fig. 4a results in a toothbrush with an awkward configuration which is essentially unusable until the head is returned to its normal position.

Figs. 4b and 4c show the toothbrush and spring in a succession of positions where the spring bows from right to the left. Fig. 4d shows the spring alone bowed to the left; Figs. 4b and 4c show the left side tension element 16. Figs. 4e-4g show further details of the spring element through its transition from right to left bowing and the corresponding angular change of the head 12 from left to right. Figs. 4h-4i show the cross-sections of Figs. 4e and 4g respectively whereby the spring's concavity is reversed.

Figs. 5 - 10 illustrate a second preferred embodiment which differs from the first embodiment primarily in the configuration of the hinge and spring element. Similar structural elements of the handle, head and bristles will have the same reference numeral designations and new structure will have new reference numbers. In this second embodiment 40 the handle 11 and head 12 are essentially the same as before. The hinge 41 is an elongated concave or spoon shaped elastic element 43 seen most clearly in Fig. 9. Fig. 8 shows how the center area 43c of the dish is thinner than the top and bottom ends 43T, 43B respectively. This dish has a thickness of about 0.020 inches on the side edges, about 0.030 inches at the center of the dish, and 0.050 inches at the top and bottom ends where the spring element is thicker where it joins the head and handle respectively. As with the first embodiment, excess pressure on the head is translated to the top end 43T of the concave spoon-shaped spring which eventually

snaps to inverted convex shape, thus directing the head to its new angled position.

This second embodiment has the advantage of simplicity of structure and economy of manufacture, in addition to operating simply and effectively. As with the earlier-disclosed embodiment, the entire toothbrush handle, hinge and head can be molded in a single cavity mold in a single molding stage. Obviously, these toothbrushes will be manufactured in typical high-speed multi-cavity injecting molding machines, with the bristles incorporated into the toothbrush head in a standard manner.

The third embodiment 50 follows the same principles of operation of the prior embodiments, but utilizes a multi-component hinge as seen in Figs. 11, 11A, 11B and 12. In this structure the handle 61 defines at its top end a hinge yoke 62 having side walls 63 and a central pivot axis 64. The head 65 has the same pivot axis 64 and a pivot axle not shown through said axis 64.

At the bottom end 65B of the head is a detent or spring biased ball 66 (see Fig. 11A) that extends outward and engages recesses or holes 67a, 67b in the yoke. When ball 66 is in recess 67a the head is inclined to the left in its position for normal operation. When the bristles are pressed excessively hard on the teeth or gum, force is applied in the direction of arrow 68 (Fig. 11) which pivots the head clockwise about the handle within yoke 62 until ball 66 engages recess 67b. In this configuration the toothbrush would be unusable, and thus the teeth enamel would be protected from further excessive abrasion.

In this embodiment the detent is designed to release the head to pivot only when the force per arrow 68 is sufficient to overcome a pre-set threshold resistance limit of the detent. If the pre-set threshold is set at 6 ounces, then any force greater than 6 ounces will cause pivoting of the head. A variation of the embodiment of Fig. 11 will have a detent 66 as shown but only one recess 67a. When the detent is in recess 67a the head will be in the initial and proper orientation relative to the handle. When the head is forced out of this position and the detent is driven out of recess 67a, the head will be free to "flop" backward. In one version there will be a stop to limit the

backward movement of the head. In either case the head will pivot but not snap to an unusable orientation until it is manually pushed back to its initial position. In these embodiments the head either remains in its initial position until the threshold force is exceeded, or the head flexes proportionately to the applied force but does not release until the threshold is reached.

Fig. 12, parts (a) and (b) shows a variation where there is the same yoke 62 and tongue 65B as in Figs. 11 and 11A and the same pivot axis 64; however, instead of spring action by the ball detent in Figs. 11 and 11A, there is a flexible flat spring 69 which flips or snaps from being concave facing left (part a) to being concave facing right (part b) when the toothbrush head 65 pivots per arrow 70 similarly as the spring in the first embodiment disclosed herein.

All of these embodiments and other variations within the scope of this invention apply the principle of altering the position or orientation of the toothbrush head when excessive force is being applied by the bristles to the teeth or to the gums.

Although the present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses will become apparent to those skilled in the art. It is preferred, therefore, that the present invention be limited not by the specific disclosure herein, but only by the appended claims.

CLAIMS

1. A toothbrush operable by a user and comprising a handle having a distal end, a head having a proximal end extending from said handle's distal end, said head having bristles extending generally in a first direction designated "forward", said head having a first orientation relative to said handle when said head is relaxed, said head, when a force greater than a predetermined threshold level is applied to said head in a direction generally opposite said first direction, being pivotable relative to said handle out of said first orientation to a second orientation rearward of said first orientation, said head remaining out of said first orientation until it is manually returned by said user to said first orientation.

2. A toothbrush according to claim 1 wherein said second orientation is a specific position of a predetermined angulation from said first orientation.

3. A toothbrush according to claim 2 wherein said second orientation is a specific position at least ten degrees from said first orientation.

4. A toothbrush according to claim 2 wherein said second orientation is approximately twenty degrees rearward of said first orientation.

5. A toothbrush according to claim 1 wherein said head is freely pivotable in said second orientation.

6. A toothbrush according to claim 1 wherein said second orientation is any position different and rearward from said first orientation.

7. A toothbrush according to claim 1 wherein said predetermined threshold level of force is in the range of about two to twelve ounces.

8. A toothbrush according to claim 7 wherein said predetermined threshold level of force is about six ounces.

9. A toothbrush according to claim 1 further comprising a hinge coupling said handle and said head, said hinge comprising at least one spring element engaging said head and said handle and urging said head to remain in said first orientation until said force exceeding said predetermined threshold level is applied.

10. A toothbrush according to claim 9 wherein said hinge further comprises at least one connecting element coupling said handle and said head.

11. A toothbrush according to claim 9 wherein said spring element is a bi-stable spring having separate first and second positions corresponding respectively to said first and second orientations of said head with respect to said handle, said bi-stable spring, when said force exceeding said threshold is applied to said head, snaps said head to said second orientation and maintains said head at said second orientation until said head is manually pushed forward until said spring snaps said head back to said first orientation.

12. A toothbrush according to claim 9 wherein said threshold level of force is substantially the same for causing said bi-stable spring to snap from its first position to its second position and for causing said bi-stable spring to snap from its second position to its first position.

13. A toothbrush according to claim 1 wherein said handle and head

comprise a single continuous molded product.

14. A toothbrush according to claim 9 wherein said handle and head are separate elements, and said handle's distal end and said head's proximal end are coupled together forming said hinge, and said spring element is situated between and engaging said distal and proximal ends of said handle and said head respectively.

15. A toothbrush according to claim 14 wherein said handle's distal end and said head's proximal end comprises hinge elements of said hinge, and said spring element comprises a spring-biased detent in one said hinge elements and the other of said hinge elements has a first detent-engaging element, said detent and first detent-engaging element comprising a spring coupling, whereby said predetermined threshold force level is the force required to overcome the spring coupling to release said head to pivot out of said first orientation.

16. A toothbrush according to claim 15, further comprising a second detent-engaging element spaced from said first detent-engaging element on said other of said hinge elements, said second detent-engaging element situated to releasably secure said head in said second orientation rearward of said first orientation when said head is pivoted out of said first orientation.

17. A toothbrush according to claim 9 wherein said handle's distal end and said head's proximal end comprises hinge elements of said hinge, and wherein said spring element comprises a resilient element extending from one of said hinge elements and releasably engaging the other of said hinge elements.

18. A toothbrush operable by a user and comprising a head with bristles which extend in a generally first forward direction from said head, a handle, and

a hinge connecting said head and said handle, said head having a normal position relative to the handle, said hinge comprising biasing means urging said head to remain in said normal position, said head being pivotable about said hinge from said normal position backwards in a second direction generally opposite from said first direction when a force exceeding a predetermined threshold level of said biasing means is applied to said head in said second direction, said head remaining out of said normal position until said head is manually returned to said normal position by said user.

19. A toothbrush according to claim 9 wherein said hinge comprises a pre-stressed bi-stable spring having two alternative shapes, said spring in its pre-stressed state being generally stiff and tending to stay in such state until a force exceeding a predetermined threshold level is applied to said spring which causes it to snap to its other shape, said spring coupled to said head and to said handle, whereby said head automatically pivots to its second orientation when a force exceeding said threshold level force is applied thereto.

20. A toothbrush according to claim 19 wherein said head automatically returns to its first orientation when a force exceeding said threshold force is applied to said head in said first direction.

21. A toothbrush according to claim 20 wherein said handle has a central longitudinal axis, and said bi-stable spring comprises a central strip generally parallel to said handle axis and two tension strips adjacent and generally parallel to said central strip, said central strip being resilient and in compression and having a bow configuration.

22. A toothbrush according to claim 20 wherein each of said tension strips is bendable in the general area of their connection to said head.

23. A toothbrush according to claim 19 wherein said hinge comprises a bi-stable spring formed as an elongated resilient dish-shaped element having a generally concave configuration and a pair of tension strips adjacent and generally parallel to said spring element, said spring element being in compression with its distal end rigidly extending from said head.

24. A toothbrush according to claim 23 wherein each of said tension strips is bendable in the general area of its connection to said head.

25. A toothbrush according to claim 9 wherein said hinge comprises a yoke at said distal end of said handle, a tongue at said proximal end of said head, a pivot axis extending through said yoke and tongue, whereby said head is movable between two angular positions, said hinge further comprising restraining means releasably restraining said tongue in at least one of said positions relative to said yoke.

26. A toothbrush comprising a handle, a head with bristles and a neck interconnecting said handle and said head in a predetermined first angular relationship, said head being bendable relative to said handle about a bend axis in said neck, said neck having a predetermined stiffness wherein said neck resists bending of said head relative to said handle, said neck being bendable about said bend axis to a second angular relationship different from said first angular relationship and back again when a force is applied to said head that overcomes said stiffness of said neck.

27. An automatic pressure release toothbrush operable by a user and comprising a handle, a head extending from said handle, said head having bristles extending generally in a first direction designated "forward", said head having a first normal, operable orientation relative to said handle, said head, when a force greater than

a predetermined threshold level is applied to said head in a direction generally opposite said first direction, automatically pivoting relative to said handle out of said first orientation to a second inoperable orientation rearward of said first orientation, said head remaining in said second orientation until it is manually returned by said user to said first orientation.

28. A method of reducing the risk of damaging tooth enamel and/or gums during brushing of a person's teeth with a toothbrush, comprising:

- a- providing a toothbrush with a handle, head and bristles extending from said exceeding a head,
- b- providing a pivotable joint between said handle and said head, and
- c- configuring said pivotable joint such that upon application of a force predetermined threshold level on said head, said head will automatically pivot or bend producing a toothbrush configuration which is either inoperative or so awkward as to effectively preventing further brushing.

29. A method of reducing the risk of damaging tooth enamel and/or gums during brushing of a person's teeth with a toothbrush, comprising:

- a- providing a toothbrush with a handle, head and bristles extending from said head,
- b- providing a pivotable joint at a selected location along the length of said handle and head, and
- c- configuring said pivotable joint such that upon application of a force exceeding a predetermined threshold level on said head, said joint will automatically change said toothbrush configuration into one that will be either inoperative or so

awkward to use as to effectively preventing further brushing.

30. A method of teaching a person how to avoid applying pressure of an unsafe magnitude to teeth and/or gums while brushing his/her teeth with a toothbrush, comprising :

- a- providing a toothbrush with a handle, head and bristles extending from said head,
- b- providing a pivotable joint at a selected location along the length of said handle and head, and
- c- configuring said pivotable joint such that upon application of a force exceeding a predetermined threshold level on said head, said joint will automatically disable the toothbrush from further use.

ABSTRACT OF THE DISCLOSURE

A toothbrush operable by a user has a handle having a distal end, a head having a proximal end extending from said handle's distal end and bristles extending generally in a first direction designated "forward". The head has a first orientation relative to the handle when the head is relaxed, the head being pivotable relative to said handle out of the first orientation to a second orientation rearward of the first orientation, when a force greater than a predetermined threshold level is applied to the head in a direction generally opposite the first direction. The head remains out of the first orientation until it is manually returned by the user to the first orientation.

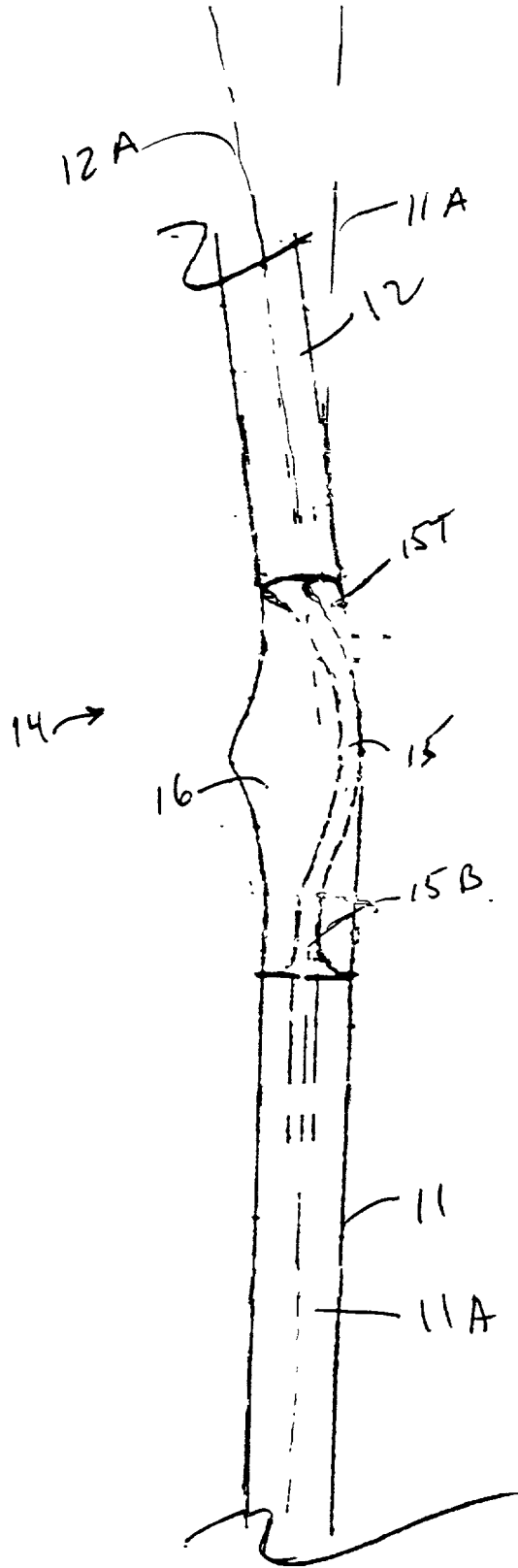


Fig 4,

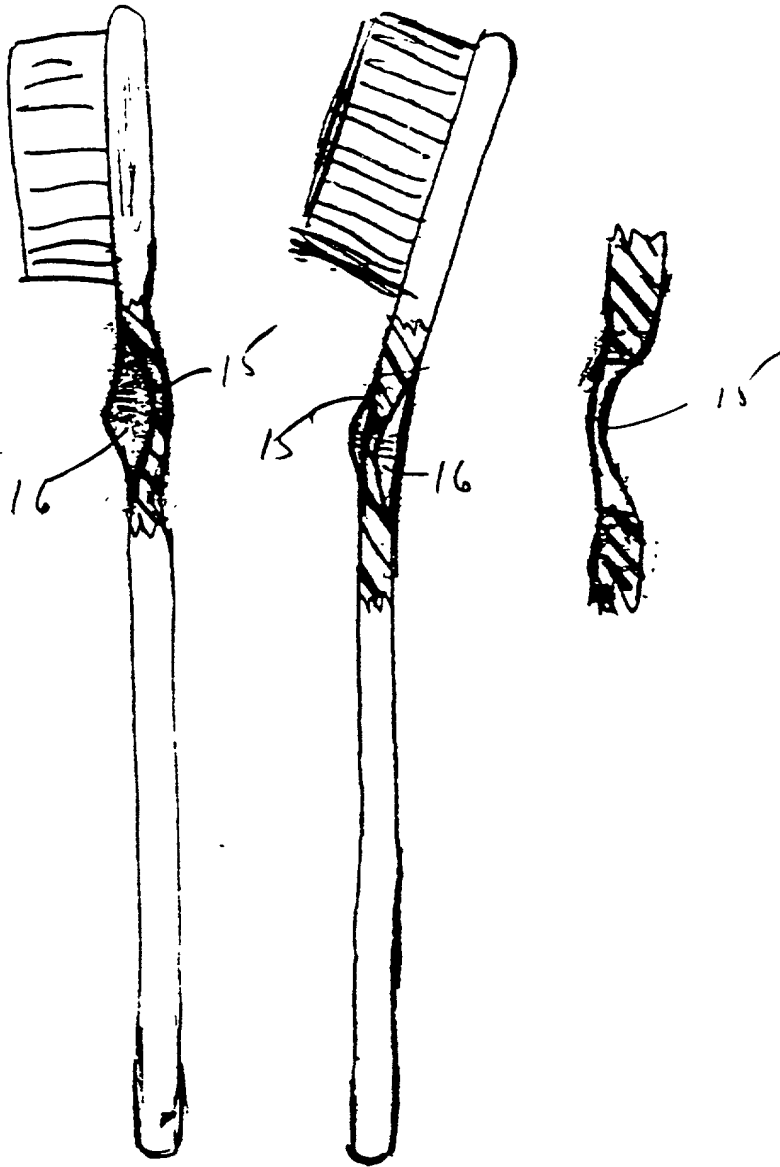


Fig 4b

Fig. 4c

Fig 4d

Fig. 5.

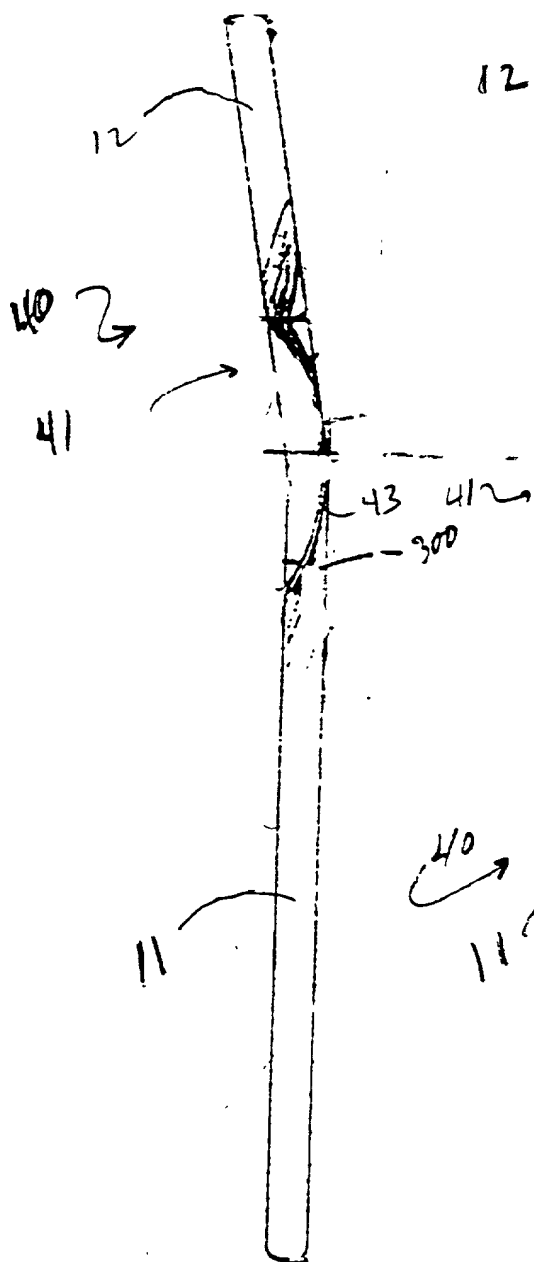


Fig. 6

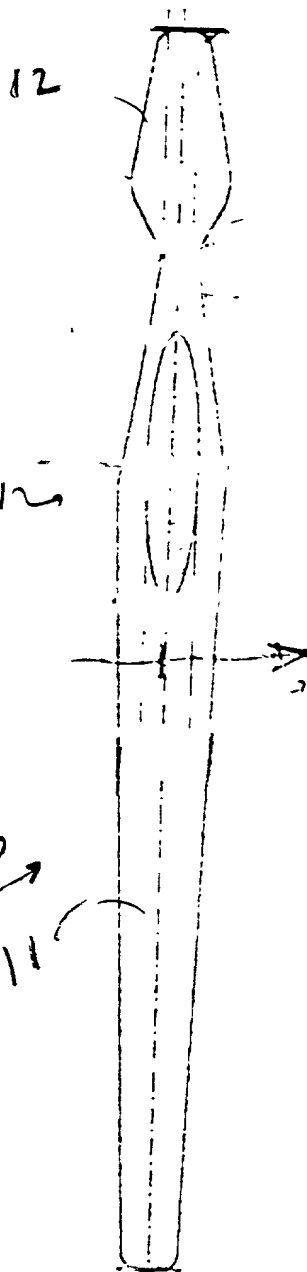
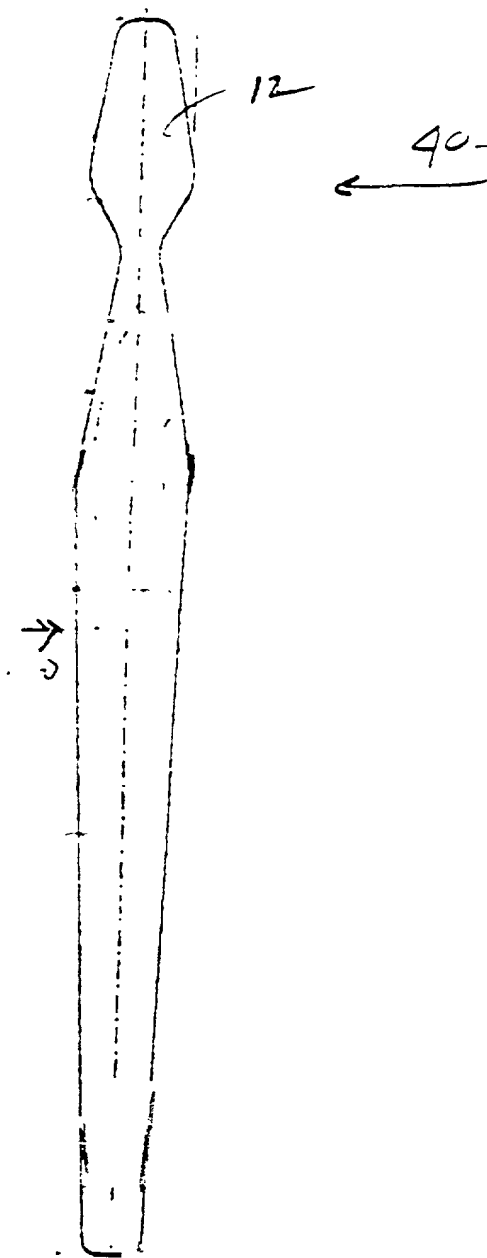


Fig. 7



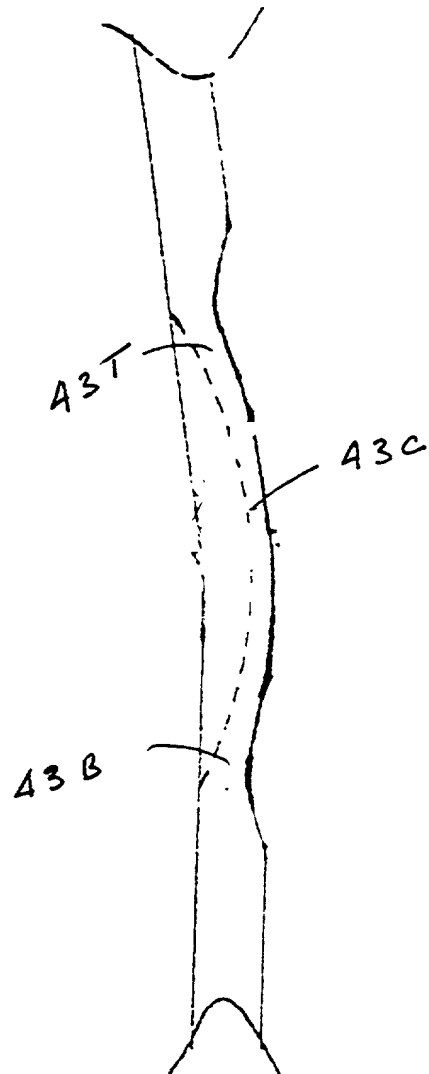
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Fig. 9

Fig. 10

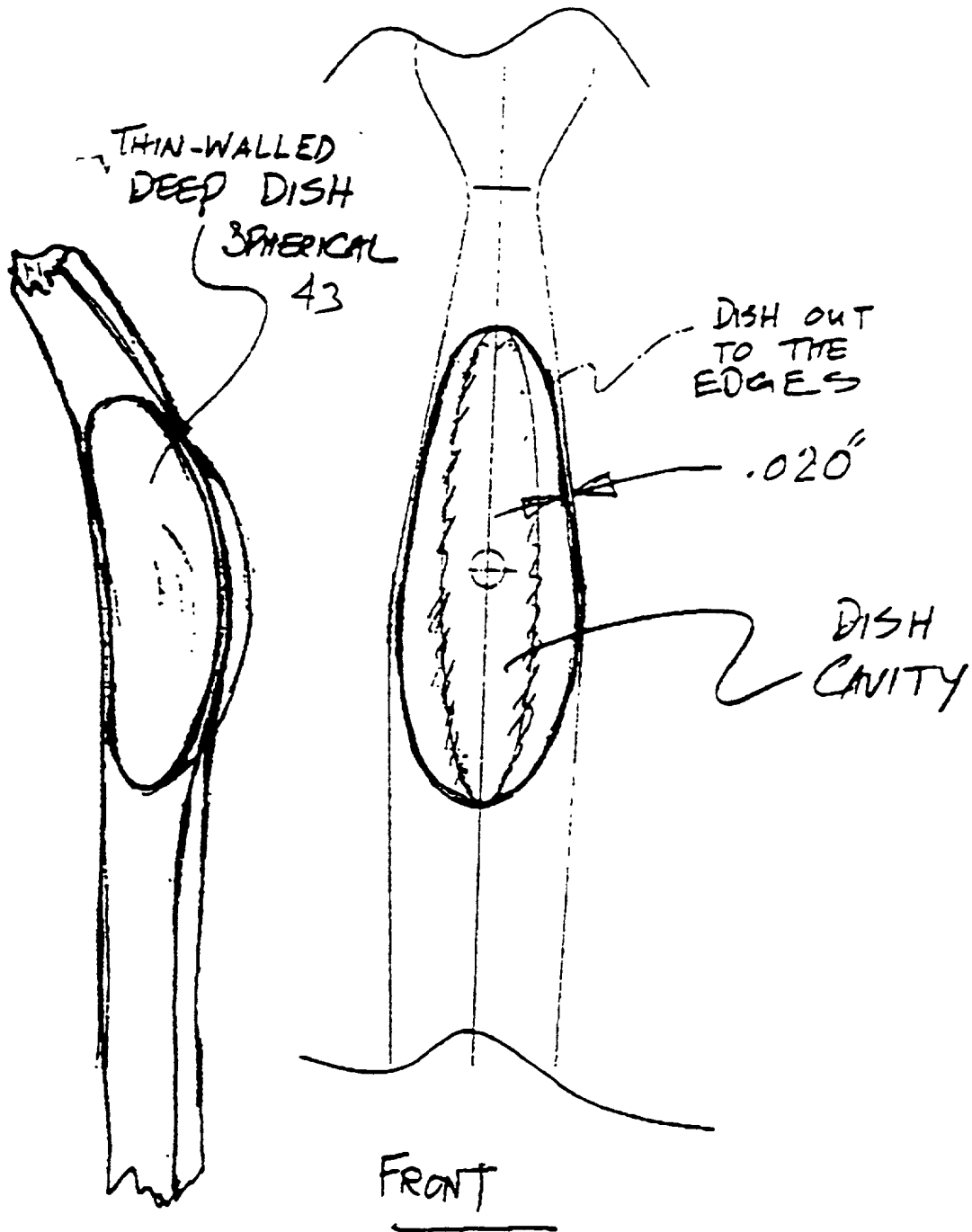


Fig. 11

Fig. 11A

Fig. 11B

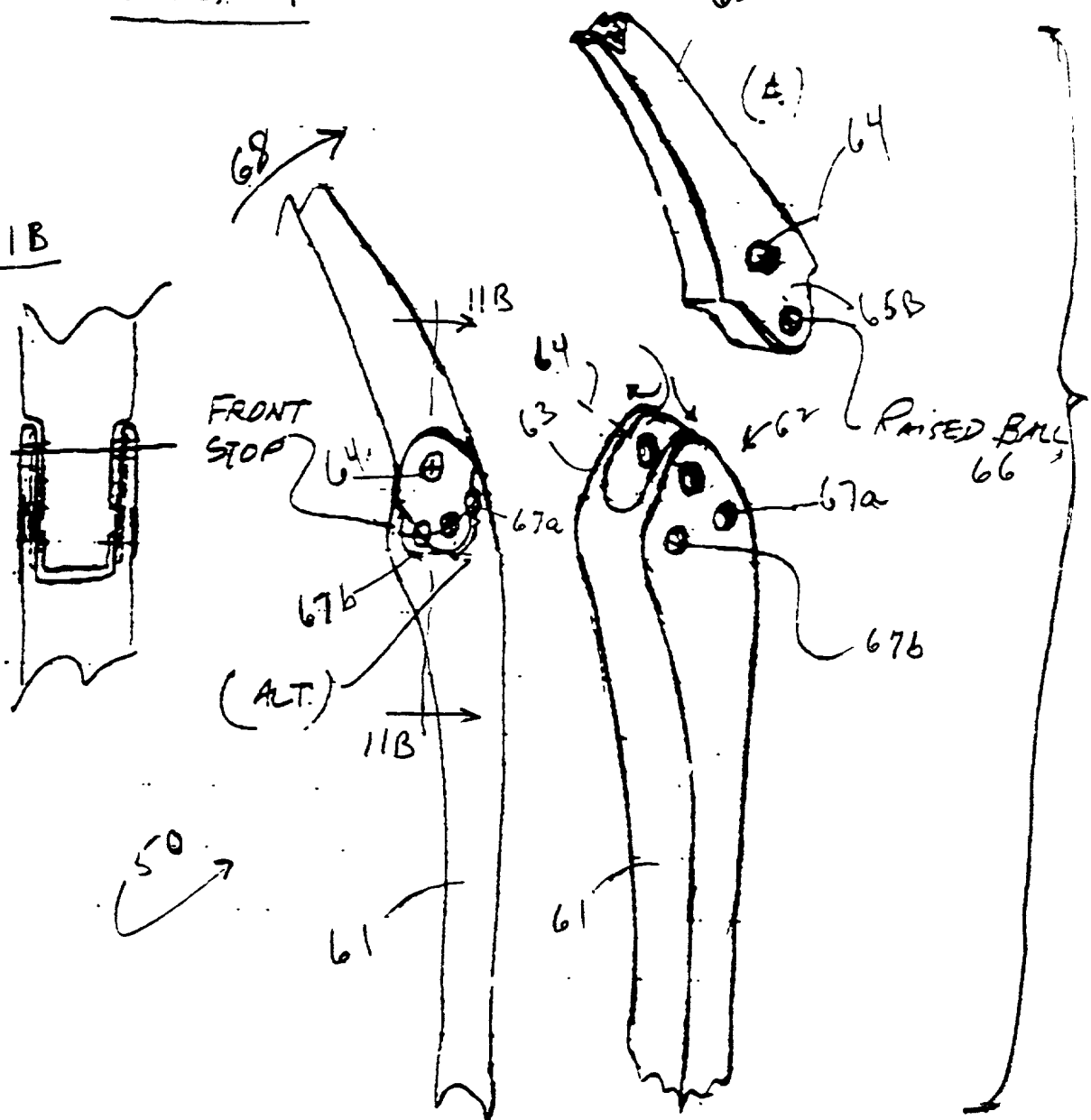
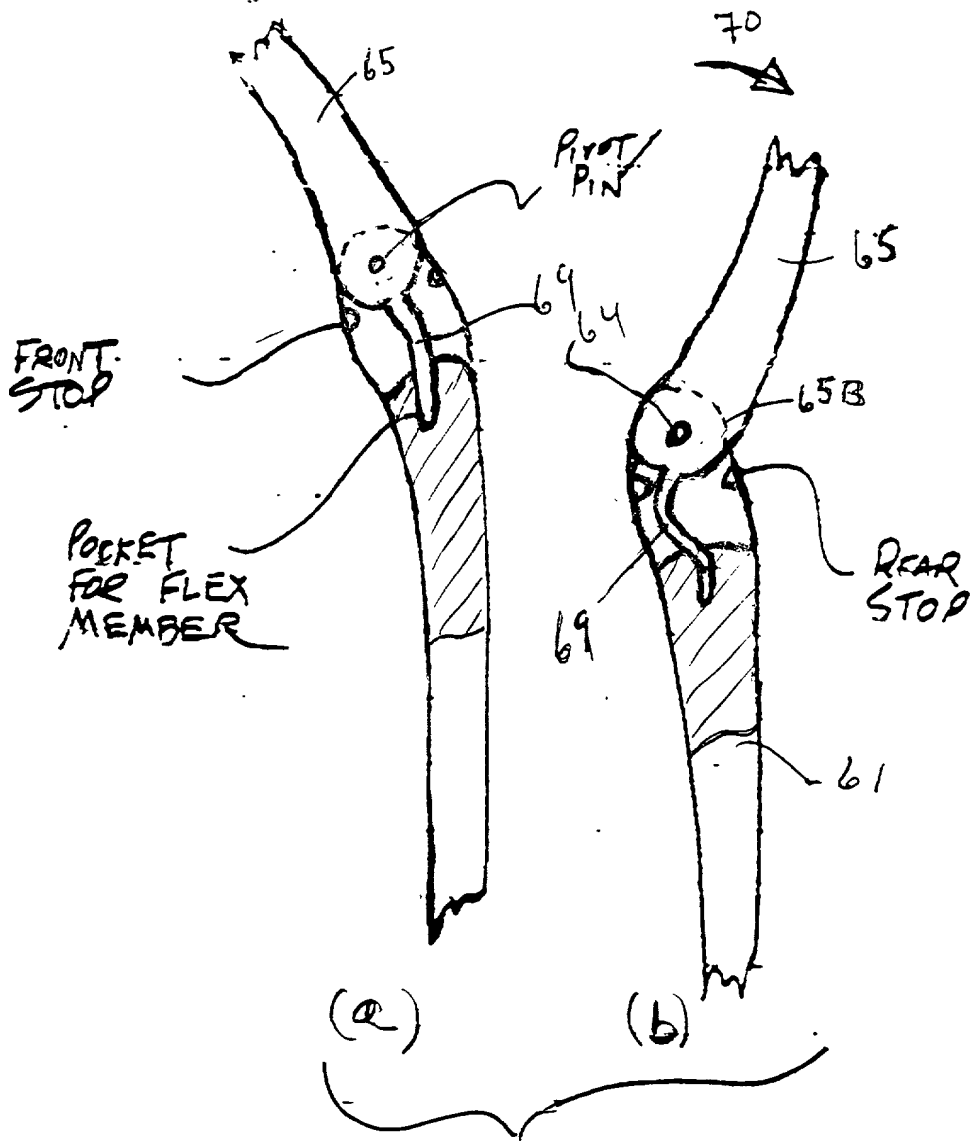
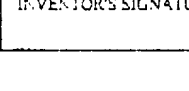

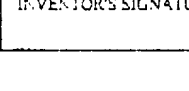

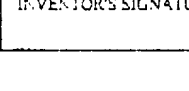



FIG. 12



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<p>As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, that I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named) of the subject matter which is claimed and for which a patent is sought on the invention entitled:</p> <p>AUTOMATIC PRESSURE RELEASE TOOTHBRUSH</p> <p>the specification of which is attached hereto, unless the following box is checked:</p> <p>was filed on _____ as United States patent Application Number or PCT International patent application number _____ and was amended on _____ (if any).</p> <p>I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.</p> <p>I acknowledge the duty to disclose all information known to be material to patentability in accordance with Title 37, Code of Federal Regulations §1.56.</p> <p>I hereby claim priority benefits under Title 35, United States Code §112, of any foreign application(s) or patent or inventor's certificate or United States provisional application(s) listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.</p> <p>Prior Provisional Application</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">COUNTRY</th> <th style="width: 25%;">APPLICATION NUMBER</th> <th style="width: 25%;">DATE OF FILING (day, month, year)</th> <th style="width: 25%;">PRIORITY CLAIMED (under statute)</th> </tr> </thead> <tbody> <tr> <td>U.S.</td> <td>60/154,418</td> <td>September 17, 1992</td> <td>YES <input checked="" type="checkbox"/> NO <input type="checkbox"/></td> </tr> <tr> <td></td> <td></td> <td></td> <td>YES <input type="checkbox"/> NO <input type="checkbox"/></td> </tr> <tr> <td></td> <td></td> <td></td> <td>YES <input type="checkbox"/> NO <input type="checkbox"/></td> </tr> </tbody> </table> <p>I hereby claim the benefit under Title 35, United States Code, §112 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application or the matter provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 35%;">UNITED STATES APPLICATION NUMBER</th> <th style="width: 35%;">DATE OF FILING (day, month, year)</th> <th style="width: 30%;">STATUS (patented, pending, abandoned)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>I hereby appoint J. 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Pitney, Hardin, Kipp & Szuch LLP 711 Third Avenue, 20th Floor New York, NY 10017</p> <p style="text-align: right;">Direct Telephone Calls To 212-297-5820</p> <p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;">FULL NAME OF SOLE OR FIRST INVENTOR ZUBAIR MIRZA</td> <td style="width: 30%;">INVENTOR'S SIGNATURE</td> <td style="width: 30%;">DATE</td> </tr> <tr> <td colspan="2">RESIDENCE (City and either State or Foreign Country) Elmwood Park, New Jersey 07407</td> <td>COUNTRY OF CITIZENSHIP USA</td> </tr> <tr> <td colspan="3">POST OFFICE ADDRESS 22A Garden Drive, Elmwood Park, New Jersey 07407</td> </tr> <tr> <td>FULL NAME OF SECOND JOINT INVENTOR (if any) INGRAM S. 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<p>I, the undersigned, being the resident, best known address and citizenship are as stated below next to my name, that I am the inventor of the invention entitled AUTOMATIC PRESSURE RELEASE TOOTHBRUSH and for which a patent is sought on the invention entitled AUTOMATIC PRESSURE RELEASE TOOTHBRUSH the specification of which is attached hereto, unless the following box is checked:</p> <p><input type="checkbox"/> was filed on <u>9/17/99</u> as United States patent Application Number or PCT International patent application number <u> </u> and was amended on <u> </u> (if any)</p> <p>I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.</p> <p>I acknowledge the duty to disclose all information known to be material to patentability in accordance with Title 37, Code of Federal Regulations, §1.56.</p> <p>I hereby claim priority benefit under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate or United States provisional application(s) listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed</p> <p>Prior Art: <u> </u></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">COUNTRY</th> <th style="width: 25%;">APPLICATION NUMBER</th> <th style="width: 25%;">DATE OF FILING (day, month, year)</th> <th style="width: 25%;">PRIORITY CLAIMED UNDER 35 USC §119</th> </tr> </thead> <tbody> <tr> <td>U.S.</td> <td>60/154,418</td> <td>September 17, 1999</td> <td>YES <input checked="" type="checkbox"/> NO <input type="checkbox"/></td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td>YES <input type="checkbox"/> NO <input type="checkbox"/></td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td>YES <input type="checkbox"/> NO <input type="checkbox"/></td> </tr> </tbody> </table> <p>I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">UNITED STATES APPLICATION NUMBER</th> <th style="width: 33%;">DATE OF FILING (day, month, year)</th> <th style="width: 34%;">STATUS (patented, pending, abandoned, ...)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>I hereby appoint J. 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